REQUEST FOR REDESIGNATION AND MAINTENANCE PLAN FOR OZONE ATTAINMENT IN THE 8-HOUR OZONE BASIC NONATTAINMENT AREA

Vanderburgh and Warrick Counties, Indiana

Developed By:
The Indiana Department of Environmental Management

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MAINTENANCE PLAN FOR OZONE ATTAINMENT
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VANDERBURGH AND WARRICK COUNTIES, INDIANA

1.0 INTRODUCTION

This document is intended to support Indiana's request that Vanderburgh and Warrick Counties, in Southwestern Indiana, be redesignated from nonattainment to attainment of the 8-hour ozone standard. These counties have recorded three years of complete, quality-assured ambient air quality monitoring data for the years 2002 – 2004 demonstrating attainment with the 8-hour ozone standard.

Section 107 of the Clean Air Act (CAA) establishes specific requirements to be met in order for an area to be considered for redesignation including:

(a) A determination that the area has attained the 8-hour ozone standard.
(b) An approved State Implementation Plan (SIP) for the area under Section 110(k).
(c) A determination that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the SIP and other federal requirements.
(d) A fully approved maintenance plan under Section 175(A).
(e) A determination that all Section 110 and Part D requirements have been met.

This document addresses each of those requirements. It also provides additional information to support continued compliance with the 8-hour ozone standard.

1.1 Background

The Clean Air Act Amendments of 1990 (CAAA) required areas failing to meet the National Ambient Air Quality Standard (NAAQS) for ozone to develop SIPs to expeditiously attain and maintain the standard. In 1997 the United States Environmental Protection Agency (U.S. EPA) revised the air quality standard for ozone replacing the 1979 1-hour standard with an 8-hour ozone standard set at 0.08 parts per million (ppm). The standard was challenged legally and upheld by the U.S. Supreme Court in February of 2001. The U.S. EPA designated areas that attain or do not attain the 8-hour ozone standard on April 15, 2004.

Vanderburgh County was designated as Marginal nonattainment for the one-hour ozone standard pursuant to the 1990 CAAA. After several years of monitored data showing the air quality met the one-hour standard, Vanderburgh County was redesignated to attainment on December 9, 1997. At the time of the 1990 CAAA, there were no monitors in Warrick County that violated

the one-hour standard. Since that time, a monitoring network has been developed that includes a total of six sites in Posey, Vanderburgh, and Warrick Counties. On April 15, 2004, U.S. EPA designated Vanderburgh and Warrick Counties Basic nonattainment and subject to the new 8-hour ozone requirements. This requires the development of a plan to reduce volatile organic compound (VOC) and oxides of nitrogen (NO_x) emissions and a demonstration that the area will meet the 8-hour ozone standard by June 2009.

1.2 Geographical Description

Vanderburgh and Warrick are adjacent counties, located in southwestern Indiana. The city of Evansville is located in Vanderburgh County, which is west of Warrick County. Posey County is to the west of Vanderburgh, Gibson and Pike are to the north. Spencer County is to the east of Warrick County. Both Vanderburgh and Warrick are bordered on the south by the Ohio River. This area is shown in Figure 3.1.

1.3 Status of Air Quality

Ozone monitoring data for the most recent three (3) years, 2002 through 2004, demonstrates that air quality has met the NAAQS for ozone in this Basic nonattainment area. This fact, accompanied by the decreases in emission levels discussed in Section 4.0, justifies a redesignation to attainment for the subject area based on Section 107(d)(3)(D) of the CAAA.

2.0 REQUIREMENTS FOR REDESIGNATION

2.1 General

Section 110 and Part D of the CAAA lists the requirements that must be met by nonattainment areas prior to consideration for redesignation to attainment. In addition, U.S. EPA has published detailed guidance in a document entitled, *Procedures for Processing Requests to Redesignate Areas to Attainment*, issued September 4, 1992, to Regional Air Directors. This document is hereafter referred to as the "Redesignation Guidance". This Request for Redesignation and Maintenance Plan is based on the Redesignation Guidance, supplemented with additional guidance received from staff of the Criteria Pollutant Section of U.S. EPA Region V.

The subsections below refer in greater detail to the requirements listed in Section 1.0 of this document. Each subsection describes how the requirement has been met. The pertinent sections of the CAAA are referenced where appropriate.

2.2 Ozone Monitoring

107(d)(3)(D)(i)

1) A demonstration that the NAAQS for ozone, as published in 40 CFR 50.4, has been attained. Ozone monitoring data must show that violations of the ambient standard are no longer occurring.

2) Ambient monitoring data quality assured in accordance with 40 CFR 58.10, recorded in the Aerometric Information and Retrieval System (AIRS) data base, and available for public view.

3) A showing that the three-year average of the fourth highest values, based on data from all monitoring sites in the area or its affected downwind environs, is below 85 parts per billion (ppb). This showing must rely on three (3) complete, consecutive calendar years of quality assured data.

4) A commitment that, once redesignated, the State will continue to operate an appropriate monitoring network to verify the maintenance of the attainment status.

2.3 Emission Inventory

107(d)(3)(D)(iii)

1) A comprehensive emission inventory of the precursors of ozone completed for the base year.

2) A projection of the emission inventory for a year at least 10 years following redesignation.

3) A demonstration that the projected level of emissions is sufficient to maintain the ozone standard.

4) A demonstration that improvement in air quality between the year violations occurred and attainment was achieved is based on permanent and enforceable emission reductions and not on temporary adverse economic conditions or unusually favorable meteorology.

5) Provisions for future annual updates of the inventory to enable tracking of the emission levels including an annual emission statement from major sources.

2.4 Modeling Demonstration

While no modeling is required for redesignating ozone nonattainment areas, IDEM has relied upon it extensively to determine necessary controls for this area.

2.5 Controls and Regulations

107(d)(3)(D)(ii) & 107(d)(3)(D)(v)

1) A U.S. EPA approved SIP control strategy that includes Reasonably Available Control Technology (RACT) requirements for existing stationary sources covered by Control Technology Guidelines (CTG) and non-CTG RACT for all major sources.

2) Evidence that control measures required in past ozone SIP revisions have been fully implemented.

3) Acceptable provisions to provide for new source review.

4) Assurances that existing controls will remain in effect after redesignation, unless the State demonstrates through photochemical modeling that the standard can be maintained without one or more controls.

5) If appropriate, a commitment to adopt a requirement that all transportation plans conform with, and are consistent with, the SIP.

2.6 Corrective Actions for Potential Future Violations of the Standard

1) A commitment to submit a revised plan eight years after redesignation.

2) A commitment to expeditiously enact and implement additional contingency control measures in response to exceeding specified predetermined levels (triggers) or in the event that future violations of the ambient standards occur.

3) A list of potential contingency measures that would be implemented in such an event.

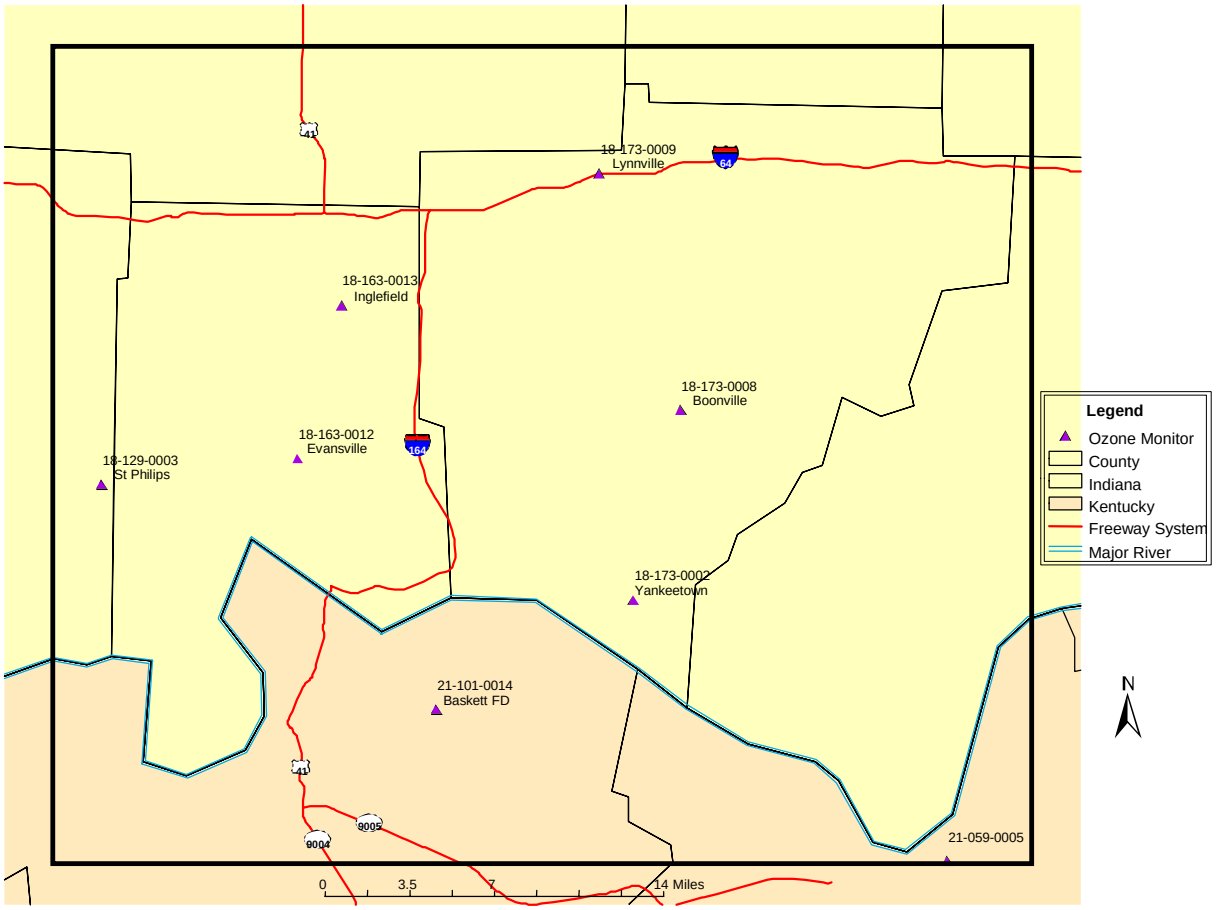
4) A list of VOC and NO_x sources potentially subject to future controls.

3.0 OZONE MONITORING

3.1 Ozone Monitoring Network

There have been five (5) monitors measuring ozone concentrations in this nonattainment area and a sixth in Posey County. All of the monitors are currently operated by the IDEM, Office of Air Quality (OAQ) and through a contract with the Evansville Environmental Protection Agency. A listing of the sites with the four highest readings from 2002 through 2004 is shown in Table 3.1 and was retrieved from the U.S. EPA's Air Quality System (AQS). The locations of the monitoring sites for this nonattainment area are shown in Figure 3.1.

Figure 3.1 Vanderburgh & Warrick Counties Basic Nonattainment Area



3.2 Ambient Ozone Monitoring Data

The following information is taken from U.S. EPA's "Guideline on Data Handling Conventions for the 8-Hour Ozone National Ambient Air Quality Standard (NAAQS)," EPA-454/R-98-017, December 1998.

Three complete years of ozone monitoring data are required to demonstrate attainment at a monitoring site. The 8-hour primary and secondary ozone ambient air quality standards are met at an ambient air quality monitoring site when the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to 0.08 ppm (i.e. the site is said to be in attainment). Three significant digits must be carried in the computations. Because the third decimal digit, in ppm, is rounded, 0.084 ppm is the largest concentration that is less than, or equal to, 0.08 ppm. These data handling procedures are applied on an individual basis at each monitor in the area. An area is in compliance with the 8-hour ozone NAAQS if, and only if, every monitoring site in the area meets the NAAQS. An individual site's 3-year average of the annual fourth highest daily maximum 8-hour average ozone concentration is also

called the site's *design value*. The air quality design value for the area is the highest design value among all monitor sites in the area.

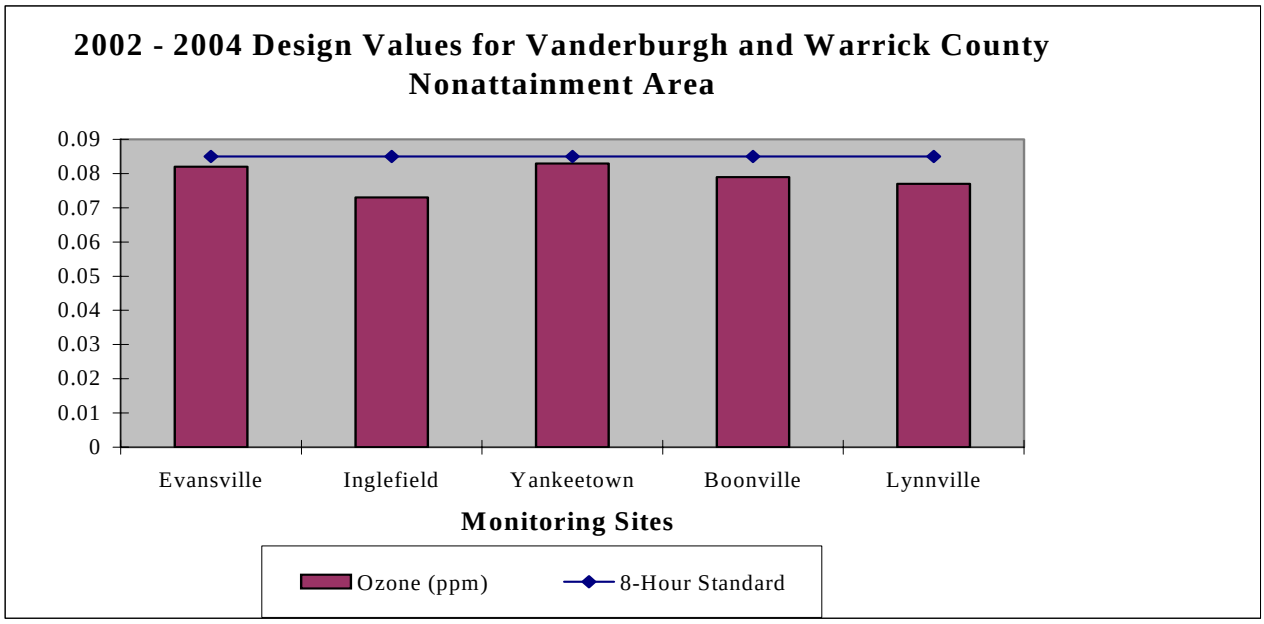
Table 3.1 shows the monitoring data for the three most recent years, 2002 - 2004, at the five nonattainment area sites.

Table 3.1 Monitoring Data for Vanderburgh and Warrick Counties 2002 - 2004

				1ST	2ND	3RD	4TH	2002-2004
SITE ID	COUNTY	LOCATION	YEAR	8-HR	8-HR	8-HR	8-HR	Design Value
18-163-0012	VANDERBURGH	EVANSVILLE	2002	0.105	0.102	0.096	0.095	
18-163-0012	VANDERBURGH	EVANSVILLE	2003	0.089	0.086	0.082	0.081	
18-163-0012	VANDERBURGH	EVANSVILLE	2004	0.078	0.074	0.073	0.072	**0.082**
18-163-0013	VANDERBURGH	INGLEFIELD	2002	0.097	0.095	0.089	0.086	
18-163-0013	VANDERBURGH	INGLEFIELD	2003	0.085	0.081	0.075	0.075	
18-163-0013	VANDERBURGH	INGLEFIELD	2004	0.065	0.061	0.058	0.057	**0.073**
18-173-0002	WARRICK	YANKEETOWN	2002	0.113	0.097	0.094	0.094	
18-173-0002	WARRICK	YANKEETOWN	2003	0.101	0.090	0.082	0.082	
18-173-0002	WARRICK	YANKEETOWN	2004	0.075	0.074	0.074	0.074	**0.083**
18-173-0008	WARRICK	BOONVILLE	2002	0.107	0.093	0.092	0.091	
18-173-0008	WARRICK	BOONVILLE	2003	0.087	0.087	0.083	0.076	
18-173-0008	WARRICK	BOONVILLE	2004	0.084	0.076	0.073	0.072	**0.079**
18-173-0009	WARRICK	LYNNVILLE	2002	0.094	0.091	0.091	0.090	
18-173-0009	WARRICK	LYNNVILLE	2003	0.089	0.086	0.082	0.078	
18-173-0009	WARRICK	LYNNVILLE	2004	0.070	0.066	0.064	0.064	**0.077**

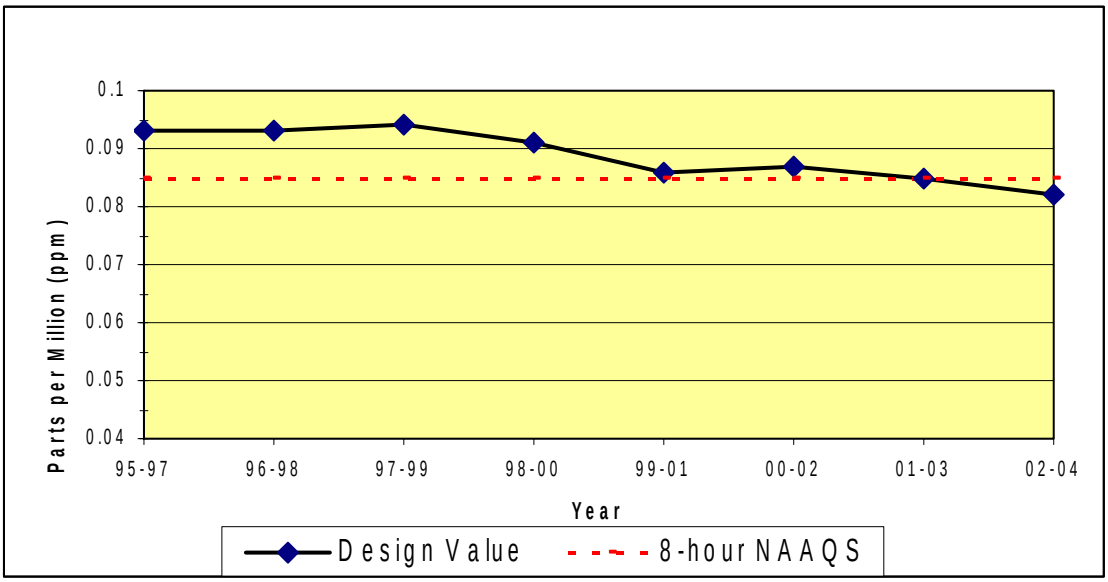
The graph below visually demonstrates the design values for this nonattainment area.

Graph 3.1 2002-2004 Design Values for Vanderburgh / Warrick Nonattainment Area.



The design values calculated for the Vanderburgh and Warrick Counties nonattainment area demonstrate that the NAAQS for ozone has been attained.

Graph 3.2 Trends in Southwestern Indiana 8-Hour Design Values, 1995 through 2004



The above graph shows the trend in design values for the region over the past several years. A comprehensive list of the site's design values over this time period is in Appendix A. The area's design value has trended downward, as emissions have declined due to such factors as the Acid Rain program and cleaner automobiles and fuels on both regional and local scales. U.S. EPA's rule to control nitrogen oxides from specific source categories referred to as the NO_x SIP Call (40 CFR Parts 51, 72, 75 and 96, published on October 17, 1998) has significantly reduced emissions from large electric generating units (EGUs), industrial boilers and cement kilns. Indiana's NO_x Rule was adopted on June 6, 2001 (326 IAC 10-3 and 10-4). An analysis of meteorological conditions and monitoring values is in Section 7.0 and supports the conclusion that attainment of the standard as of 2004 is not the result of unusually favorable meteorological conditions. It is expected that this downward trend will continue as the above programs continue and some further reductions, such as the U.S. EPA Clean Air Interstate Rule, are implemented.

3.3 Quality Assurance

IDEM has quality assured all data shown in Appendix A in accordance with 40 CFR 58.10 and the Indiana Quality Assurance Manual. IDEM has recorded the data in the Aerometric Information Retrieval System (AIRS) database and, thus, they are available to the public.

3.4 Continued Monitoring

Indiana commits to continue monitoring ozone levels at the sites indicated in Table 3.1 and Appendix A. IDEM will consult with U.S. EPA Region V staff prior to making any changes to the existing monitoring network should changes be necessary in the future.

Following consultation with and approval from U.S. EPA, IDEM relocated the Yankeetown monitor. The new monitor location, known as Dayville, is located approximately 1.25 miles

NNW of the Yankeetown monitor's former location. We believe that the data from both of these locations could be used for the three-year assessment to determine attainment status. The land use, topography and demographics are the same for both monitoring locations. IDEM will continue to quality assure the monitoring data to meet the requirements of 40 CFR 58. Connection to a central station and updates to the IDEM website (www.state.in.us/idem/) will provide real time availability of the data and knowledge of any exceedances. IDEM will enter all data into AIRS on a timely basis in accordance with federal guidelines.

4.0 EMISSION INVENTORY

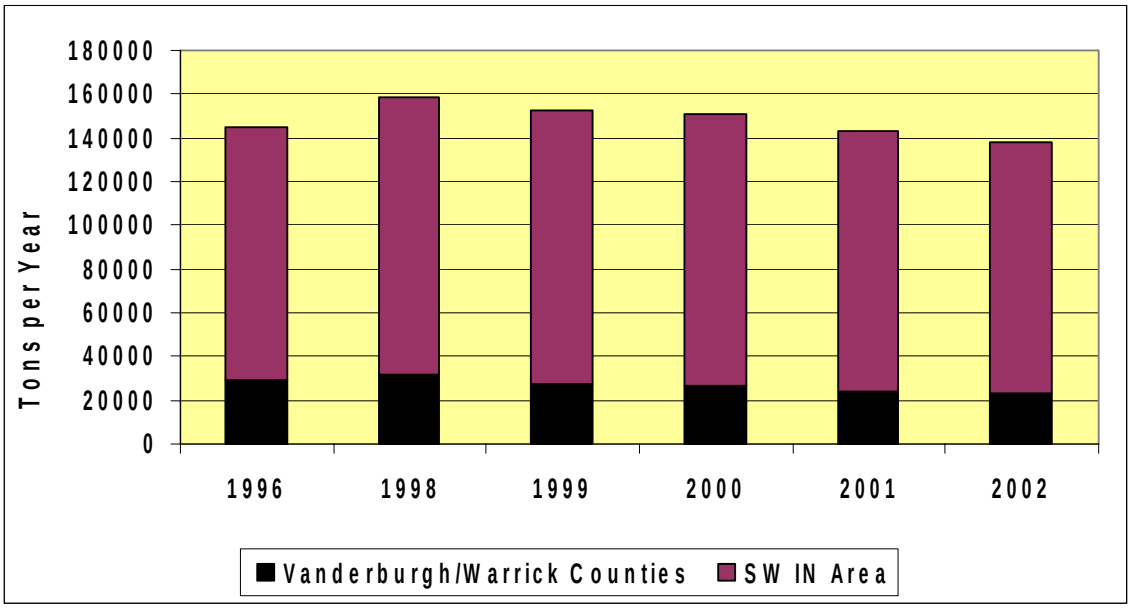
U.S. EPA's Redesignation Guidance requires the submittal of a comprehensive inventory of ozone precursor emissions (VOC and NO_x) representative of the year when the area achieves attainment of the ozone air quality standard. Indiana must also demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other emissions inventory-related requirements include a projection of the emission inventory to a year at least 10 years following redesignation, a demonstration that the projected level of emissions is sufficient to maintain the ozone standard, and a commitment to provide future updates of the inventory to enable tracking of emission levels during the 10-year maintenance period.

The following subsections address each of these requirements.

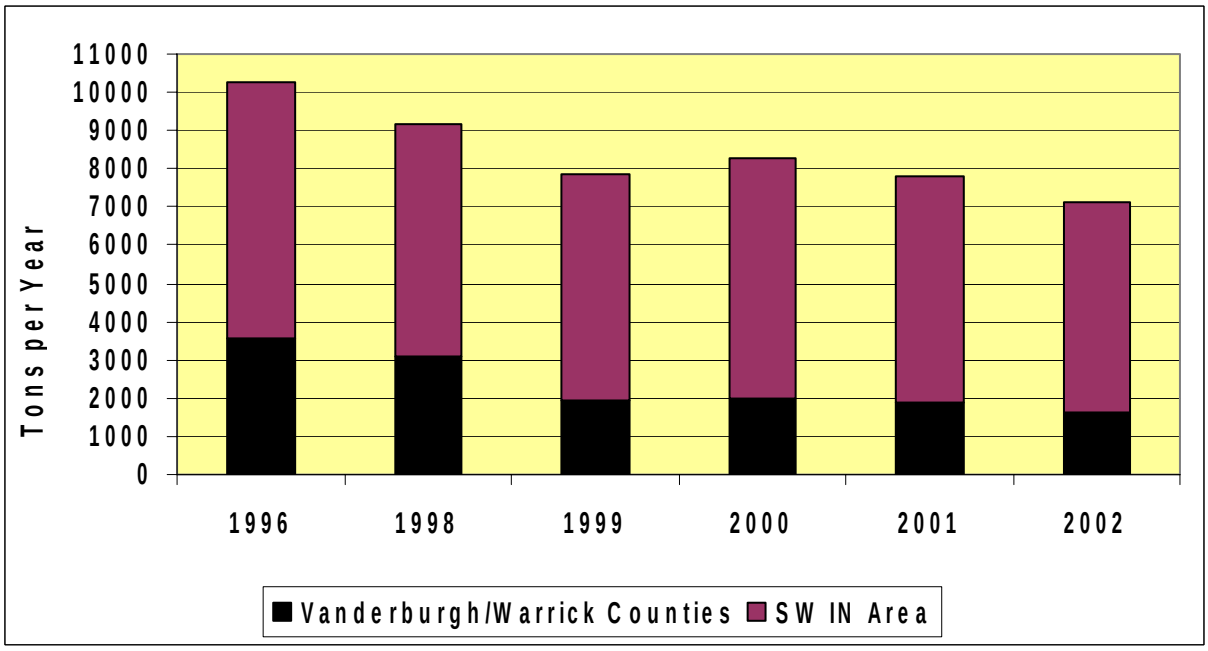
4.1 Emission Trends

Graphs 4.1 and 4.2 below show the trend in point source emissions of NO_x and VOC, respectively, that correspond to the years of monitored values used in this report. To better illustrate emissions that impact ozone formation at the monitoring sites, these graphs include the Evansville nonattainment area emissions and emissions from an additional five surrounding counties (Dubois, Gibson, Pike, Posey, Spencer) in the southwest corner of Indiana. The point source data are taken from Indiana's annual emissions reporting program. Data later than 2002 are not available for all sources.

Graph 4.1 Southwest Indiana NO_x Point Source Emissions 1996 - 2002



Graph 4.2 Southwest Indiana VOC Point Source Emissions 1996 - 2002



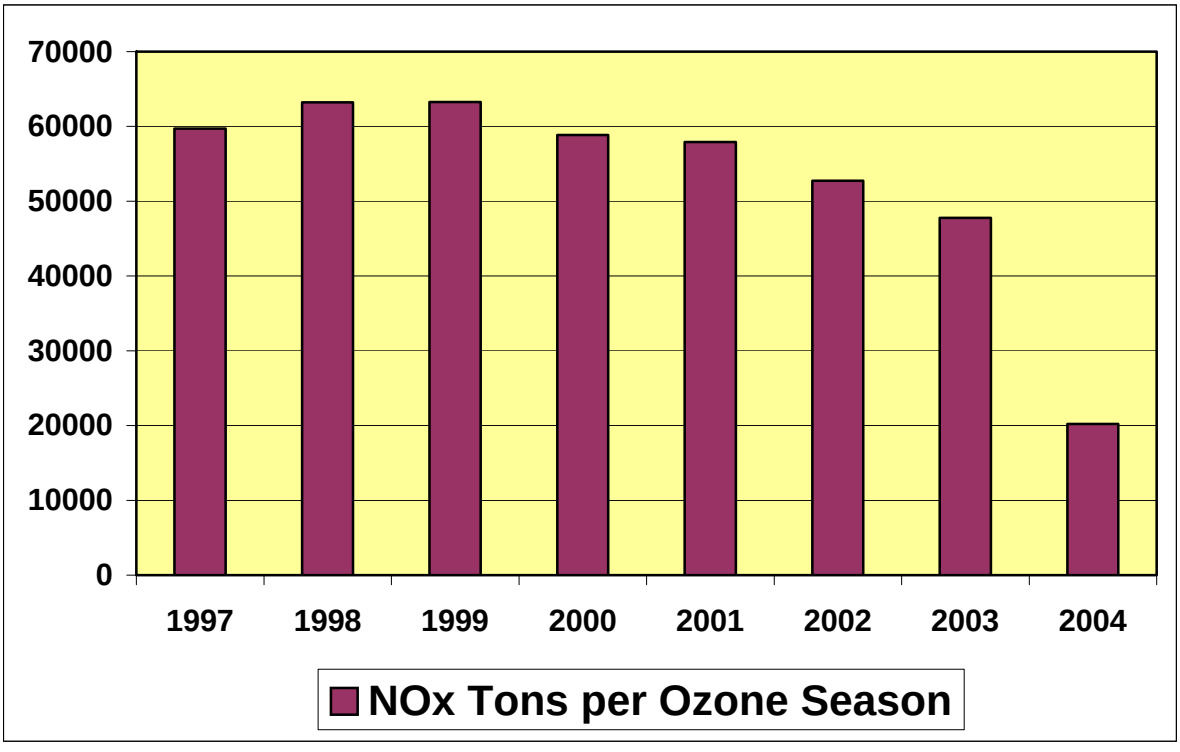
Graph 4.3 below shows the trend in regional NO_x emissions from Electric Generating Units (EGUs) for the seven southwestern Indiana counties. While ozone and its precursors are transported into this region from outside areas, this information does provide some indication of the impact from Indiana sources near the nonattainment area. The emissions are decreasing substantially in response to national programs affecting all EGUs, including the Acid Rain program and the NO_x SIP Call. Other sectors of the inventory also impact ozone formation, but

large regional sources such as EGUs have a substantial impact on the formation of ozone. This area has the highest concentration of EGUs in Indiana.

These data were taken from U.S. EPA's Clean Air Markets database (www.epa.gov/airmarkets). Data are available sooner for these units than other point sources in the inventory because of the NO_x SIP Call budget and trading requirements. Information from 2003 is significant because some EGUs started operation of their NO_x SIP Call controls in order to generate Early Reduction Credits for their future year NO_x budgets. The first season of the SIP Call budget period began May 31, 2004.

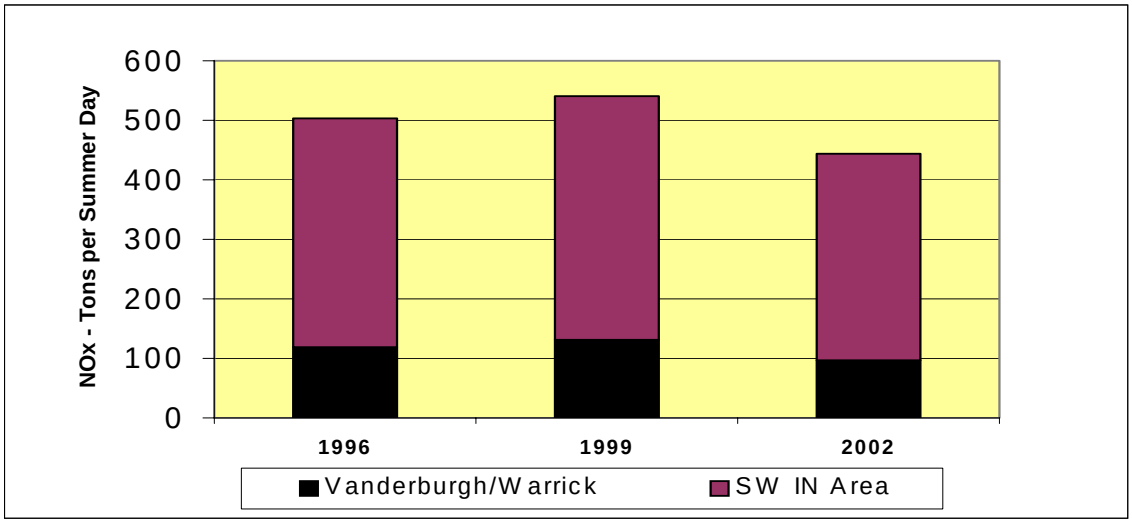
Summer season emissions from 2004 are not yet available. However, as part of the NO_x SIP Call, the states were required to adopt into their rules a budget for all large EGUs. Indiana's budget is adopted in 326 IAC 10-4. The budget represents a statewide cap on NO_x emissions. The 2004 column in the graph represents this budget. Although each unit is allocated emissions based upon historic heat input, utilities can meet this budget by over-controlling certain units or purchasing credits from the market to account for overages at other units. Therefore, although 2004 actual emissions could be higher or lower, the value is a good approximation. To summarize, NO_x emissions have substantially decreased over the years represented on these graphs. These emissions, capped by the state rule, will remain at least this low through the maintenance period covered by this request.

Graph 4.3 Emissions from Southwest Indiana Electric Generating Units

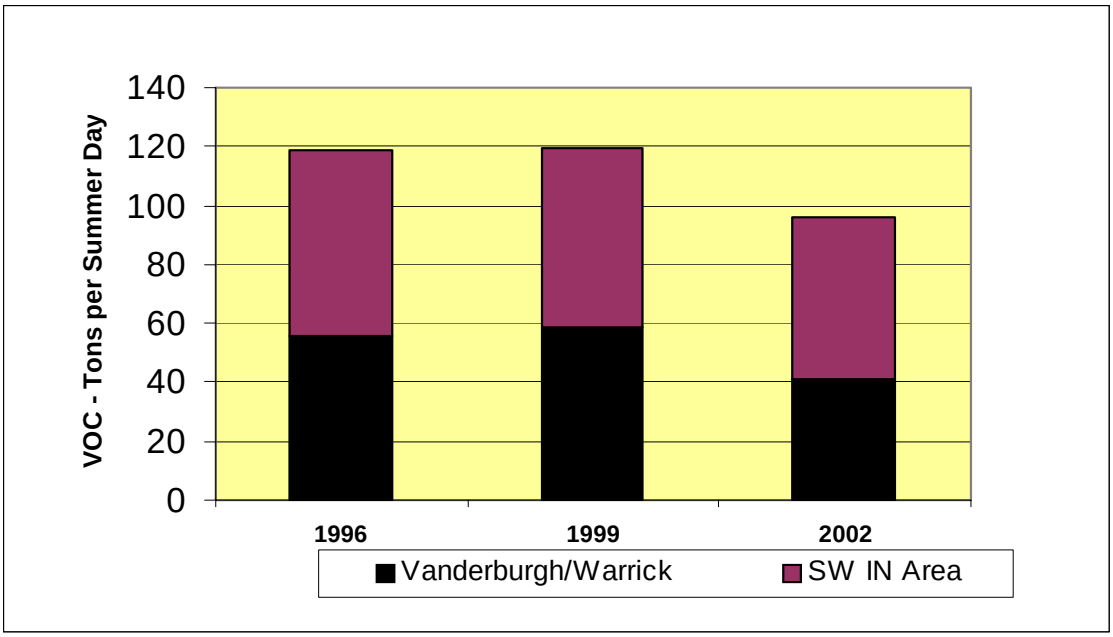


Periodic inventories, which include emissions from all sectors, mobile, area, non-road, and point sources, are prepared every three years. Graphs 4.4 and 4.5 show the trends for the total emission for all anthropogenic source categories in these years, which also roughly follow the years of monitored trends discussed in Section 3. Graphs and data tables of emissions from each source category and from the 7 county region are available in Appendix B.

Graph 4.4 NO_x Emissions Trends, 1996 - 2002, All Sources



Graph 4.5 VOC Emissions Trends, 1996 - 2002, All Sources



4.2 Base Year Inventory

IDEM prepared a comprehensive inventory for Vanderburgh and Warrick Counties, including area, mobile, nonroad, and point sources for precursors of ozone (volatile organic compounds and nitrogen oxides) for base year 2002.

- Area sources were taken from the Indiana 2002 periodic inventory submitted to U.S. EPA. These estimates were made from the U.S. Department of Commerce Bureau of Economic Analysis (BEA) growth factors, with some updated local information.
- Mobile source emissions were calculated using MOBILE6 produced emission factors. 1996 and 1999 data were taken from the National Emissions Inventory (NEI) maintained by EPA. 2002 data was calculated using the travel demand model and post-processor provided by the Evansville Urban Transportation Study (EUTS). See Section 5.0.
- Point source information was compiled from IDEM's 2002 annual emissions statement database and the 2002 U.S. EPA Air Markets acid rain database. www.epa.gov/airmarkets/acidrain
- Biogenic emissions are not included in these summaries.
- Nonroad emissions were generated by U.S. EPA and are part of the 2002 National Emissions Inventory (NEI). To address concerns about the accuracy of some of the categories in U.S. EPA's Nonroad emissions model, the Lake Michigan Air Directors' Consortium (LADCO), the Midwest Regional Planning Organization, contracted with two companies to review the base data and make recommendations. One of the contractors also estimated emissions for two nonroad categories not included in U.S. EPA's Nonroad model. Emissions were estimated for commercial marine vessels and railroads. Recreational motorboat population and spatial surrogates were significantly updated. The construction equipment category was reviewed and updated based upon surveys completed in the Midwest and the temporal allocation for agricultural sources was also updated. A new nonroad estimation model was provided by EPA for the 2002 analysis.

Appendix B contains data tables and graphs of all these emissions.

4.3 Emission Projections

In consultation with the U.S. EPA, IDEM selected the year 2015 as the maintenance year for this redesignation request. This document contains projected emissions inventories for 2010 and 2015.

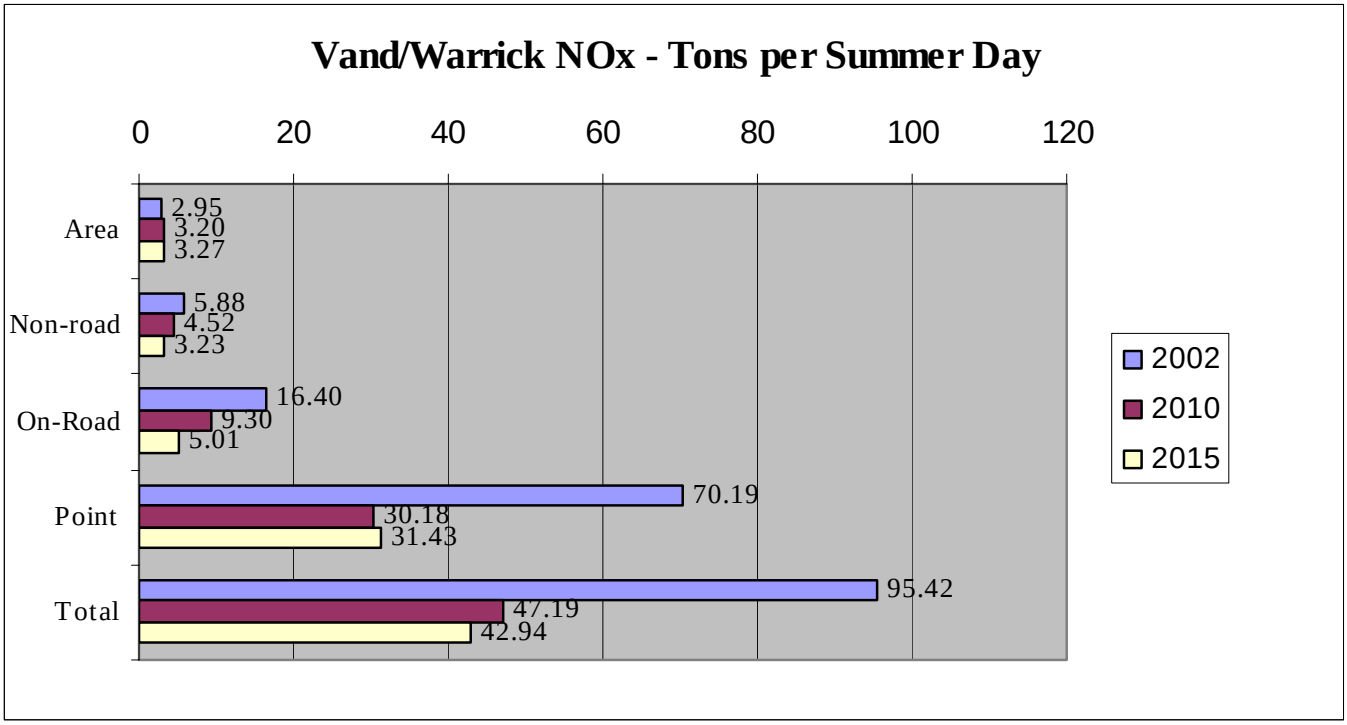
IDEM performed emission projections for Vanderburgh and Warrick using the following approaches:

- Mobile source emission projections are based on the U.S. EPA MOBILE6 model. The nonattainment area emissions were analyzed using the Evansville Urban Transportation Study's (EUTS) Travel Demand Model. This analysis is described in more detail in Section 5.0. All projections were made in accordance with "Procedures for Preparing Emissions Projections"; U.S. EPA-45/4-91-019.
- Emissions inventories are required to be projected to future dates to assess the influence growth and future controls will have. The Midwest Regional Planning Organization

(Midwest RPO) has developed growth and control files for Point, Area, and Non-road categories. These files were used to develop the future year emissions estimates used in this document. This was done so that the inventories used for redesignation are consistent with modeling performed in the future.

The detailed inventory information for 2010 and 2015 is also contained in Appendix B. Emission trends are an important gauge for continued compliance with the ozone standard. Therefore, IDEM performed an initial comparison of the inventories for the base year and maintenance years for Vanderburgh and Warrick, which are summarized below in Graphs 4.6 and 4.7. Mobile Source emission inventories are described in Section 5. In addition to the Midwest RPO's estimates, point source emissions were projected based upon the state-wide EGU NO_x budgets from the Indiana NO_x rule.

Graph 4.6 - 2002 Estimated and 2010 and 2015 Projected NO_x Emissions for Vanderburgh/Warrick



Graph 4.7 - 2002 Estimated and 2010 and 2015 Projected VOC Emissions for Vanderburgh/Warrick

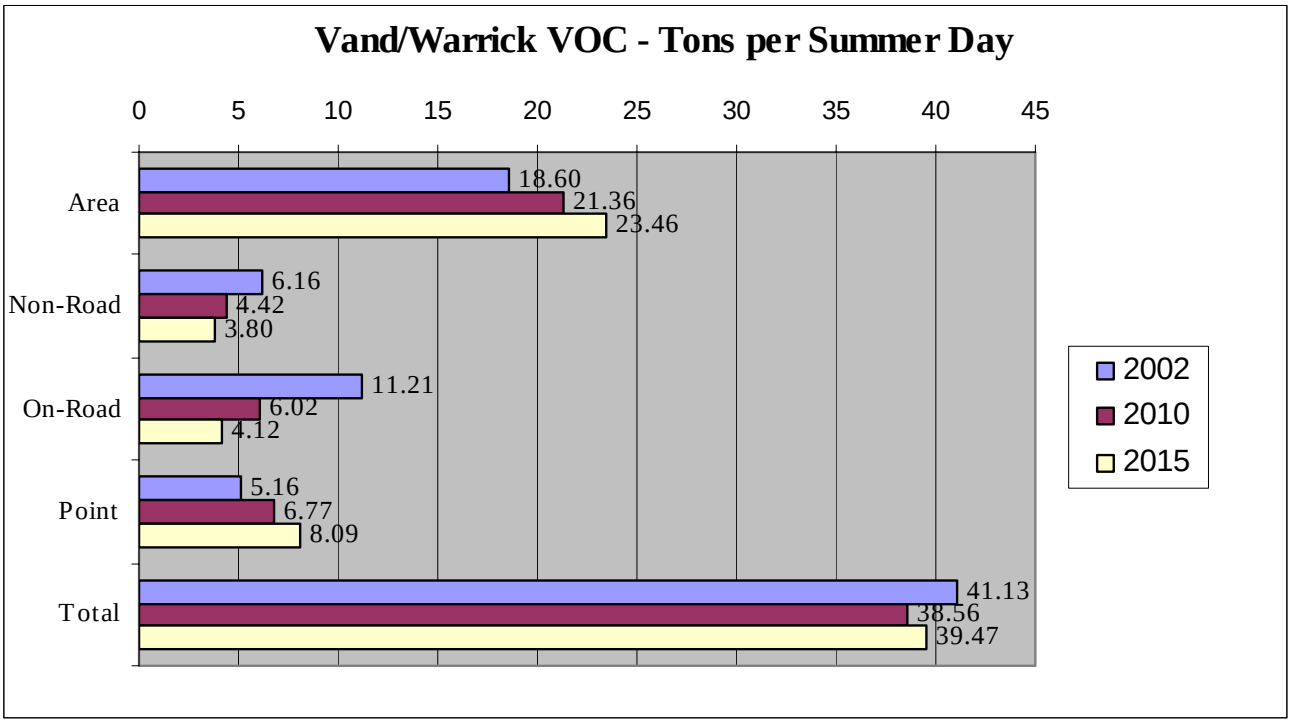


TABLE 4.1 Comparison of 2002 estimated and 2015 projected emission estimates in tons per summer day Vanderburgh and Warrick Counties, Indiana

	2002	2015	Change
VOC	41.13	39.47	-1.66 (-4.04%)
NOx	95.42	42.94	-52.48 (-55.0%)

VOC emissions in the non-attainment area are projected to decrease by 4.04%. Area source emissions, and to lesser extent point sources, shows an increase due to the expectation that population will grow considerably in this area. However, cleaner vehicles and fuels to be in place in 2010 and 2015 result in an overall drop in VOC emissions.

NO_x emissions show a large decrease at 55.0%. In 2002, point source (primarily EGU) emissions comprised over 65% of the inventory and so the implementation of the NO_x SIP Call accounts for much of this decrease. Further, due to its implementation across the eastern United States, NO_x and ozone levels entering this area will also be decreased. Also factored in are new U.S. EPA rules covering Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements[1], Highway Heavy-Duty Engine Rule[2] and Non-Road Diesel Engine Rule[3].

1 http://www.epa.gov/fedrgstr/EPA-AIR/2000/February/Day-10/a19a.htm
2 http://www.epa.gov/fedrgstr/EPA-AIR/1997/October/Day-21/a27494.htm
3 http://www.epa.gov/fedrgstr/EPA-AIR/1998/October/Day-23/a24836.htm

4.4 Demonstration of Maintenance

Ambient air quality data from all monitoring sites indicates that air quality met the NAAQS for ozone in 2004. U.S. EPA's Redesignation Guidance (page 9) states, "A state may generally demonstrate maintenance of the NAAQS by either showing that future emissions of a pollutant or its precursors will not exceed the level of the attainment inventory, or by modeling to show that the future mix of sources and emissions rates will not cause a violation of the NAAQS." NO_x emissions will be substantially reduced, while VOC emissions will slightly decrease. Section 7.0 further discusses the implications of these emissions trends and provides an analysis to support these conclusions. Therefore, air quality should meet the NAAQS ozone standard through the projected year 2015.

In Indiana, major point sources in all counties are required to submit air emissions information once every three years or annually, if VOC potential-to-emit is greater than 100 tons or NO_x is greater than 250 tons, in accordance with the Emission Statement Rule, 326 IAC 2-6. IDEM prepares a new periodic inventory for all ozone precursor emission sectors every three (3) years. These ozone precursor inventories will be prepared for 2002, 2005, 2008, and 2011, as necessary, to comply with the inventory reporting requirements established in the CAAA. Emissions information will be compared to the 2002 base year and the 2015 projected maintenance year inventories to assess emission trends, as necessary, to assure continued compliance with the ozone standard.

4.5 Permanent and Enforceable Emissions Reductions

Permanent and enforceable reductions of volatile organic compounds and oxides of nitrogen have contributed to the attainment of the 8-hour ozone standard. Some of these reductions were due to the application of RACT rules; some were due to the application of tighter federal standards on new vehicles, and some due to closure of point source facilities. Table 4.2 shows significant reductions resulting from closed plants between 1996 and 2002. Also, Title IV of the Clean Air Act and the NO_x SIP Call required the reduction of oxides of nitrogen from utility sources. Section 6.0 identifies these reductions along with an explanation of their status. Any reopening of closed facilities at these sources will require review as a new source and the application of appropriate controls.

Table 4.2 Closed Sources Annual VOC Emissions for Vanderburgh County

County	Plant ID	Plant Name	NAICS	1996	1998	1999	2000	2001	2002
163	7	HAHN INC	339999	7	2	3	8	24	0
163	10	KOCH LABEL CO., L. L. C.	323119	1152	940	0	0	0	0
163	12	GEO KOCH SONS INC #2	333414	2	4	0	0	0	0
163	47	HERITAGE PETROLEUM, LLC.	454312	6	6	6	5	3	0
163	78	ROBUR CORPORATION	333415	6	3	7	19	10	0
		Total		**1173**	**955**	**16**	**32**	**37**	**0**

4.6 Provisions for Future Updates

As required by Section 175A(b) of the CAAA, Indiana commits to submit to the Administrator, eight (8) years after redesignation, an additional revision of this SIP. The revision will contain Indiana's plan for maintaining the national primary ozone air quality standard for ten (10) years beyond the first 10-year period after redesignation.

5.0 TRANSPORTATION CONFORMITY BUDGETS

5.1 On-Road Emission Estimations

The Evansville Urban Transportation Study (EUTS) is the Metropolitan Planning Organization (MPO) for the Evansville area. This organization has a travel demand model that was updated and improved in 2003 by the consultant Bernardin-Lochmueller & Associates. The model incorporates the road network of a 5-county area, which includes the counties of Vanderburgh, Warrick, Posey, Gibson and Henderson (in Kentucky). Incorporated into the travel demand model is a post-processor created by the same consultant that uses the EPA-required emissions estimation model MOBILE6.2 to calculate total emissions.

5.2 Overview

Broadly described, MOBILE6 is used to determine “emission factors”, which are the average emissions per mile (grams/mile) for different facility types (Freeway, Arterial, Local, Ramp) at different speeds for each pollutant, thus creating a “look-up table” that is organized by speed and facility type. There is one look-up table for NO_x and one for VOCs. The travel demand model predicts the traffic volumes on all the roads in the 5-county area. Each segment of road is described as a separate “link” for which the model predicts a separate speed and volume. The post-processor matches the link attributes with an emission factor in the table and multiplies it by the VMT (Vehicle Miles Traveled: volume x length of link) to determine the emissions from that link. These emissions are then summed to determine the area’s total on-road emissions. Each year that is analyzed will have different emission factors, volumes, speeds and likely some additional links. Appendix C contains documentation provided by EUTS from a previous conformity determination that used virtually the same method. This documentation further

details the emissions analysis method. IDEM has footnoted the statements that no longer apply or need further clarification. Appendix D contains samples of the MOBILE6 input files and the actual post-processing software used for this analysis.

5.2 Analysis Years

Travel demand models contain hundreds of Travel Analysis Zones (TAZs) that have zone-specific information regarding population, employment, destinations and expected growth, among other things. These data are commonly referred to as the "socioeconomic data". The travel demand model also contains the road network, thus, the information is time specific. EUTS has modeled the years 2000, 2006, 2015, 2025 and 2030. This Redesignation Petition requires emission estimates for 2002, 2010 and 2015, thus, 2002 and 2010 did not have an exact match with the travel demand model. To predict these years, an interpolation / extrapolation method was devised.

5.3 Interpolation for 2002, 2010

To estimate 2002 emissions, the VMT was interpolated from 2000 and 2006 model VMT data. The 5-county model has nearly 4000 links. An average growth rate was determined for 18 sub-categories daytimes, vehicle and facility types. The model categorizes VMT by two types of vehicles (trucks and cars), 3 periods in the day (AM peak, PM peak and Off Peak) and 3 facility types (Freeway, Arterial and Local) for a total of 18 combinations. Each has a VMT sub-total associated with it. An annual growth factor was determined for each of these 18 categories by linearly interpolating the 5-county VMT between 2000 and 2006. These growth factors were applied to all the links. The adjusted VMT values were then sent through the post-processor using the 2000 network to calculate the total emissions from the 2-county nonattainment area.

For 2010, the VMT was extrapolated using the same annual growth rates used for 2002, not the growth rates from the 2006 to 2015 model data (See growth factor table in Appendix C). The VMT growth rates from 2006 to 2015 were less than those from 2000 to 2006. Note that the purpose of calculating emissions for 2010 is to verify that during the period between the base year and the maintenance year, overall emissions do not exceed the base year. Thus, it is prudent to use the higher growth rates to predict 2010 VMT and not underestimate 2010 on-road emissions. This method has caused the predicted 2010 VMT calculation to be higher than the 2015 modeled VMT.

Overall, these methods followed the general practice of using a linear VMT growth to interpolate VMT. However, using a slightly smaller network than would actually exist in that year may report slightly lower speeds than if a model network of that year had been available. The emissions effect is unknown, but would likely be negligible.

5.4 Local Road VMT

Not all local roads are represented in the network due to their lack of effect on the modeled road network. The post-processor multiplies the existing VMT on modeled local roads by a factor of 2.2225 to get a total local-road VMT. This was the adjustment factor determined for Vanderburgh through comparisons with HPMS. For this analysis, this factor was also applied to Warrick.

5.5 Emission Estimations

Table 5.1 contains the results of the emissions analysis for the appropriate years.

Table 5.1 - Emission Estimations for On-Road Mobile Sources

	2002	2010	2015
VMT (miles/day)	6225764	6520671	6463504
VOC (tons/day)	11.21	6.02	4.12
NOx (tons/day)	16.40	9.30	5.01

5.7 Motor Vehicle Emission Budget

Table 5.2 contains the motor vehicle emissions budget for the Evansville ozone nonattainment area (Vanderburgh and Warrick counties) for the year 2015.

Table 5.2 – Mobile Vehicle Emission Budgets

2015	tons/day
VOC	4.20
NOx	5.40

This budget includes the emission estimates calculated for 2015, and margin of safety. The emission estimates are derived from the EUTS travel demand model and MOBILE6.2 as described above under the current EUTS 2030 Long Range Plan. The safety margins include 0.08 tons/day for VOC and 0.39 tons/day for NOx. These correspond to approximately a 2% and 8% increase from the 2015 on-road emissions, respectively. Margins of safety are used to accommodate the wide array of assumptions that are factored into the calculation process. Since assumptions change over time, it is necessary to have a margin of safety that will accommodate the impact of refined assumptions in the process. This budget results in the 2015 emissions, for both VOC and NO_x, still being below the base year emissions shown in Graphs 4.6 and 4.7.

All methodologies, latest planning assumptions and the safety margins were determined through the interagency consultation process described in the Transportation Conformity Memorandum of Understanding (MOU) for the Evansville Area.

6.0 CONTROL MEASURES AND REGULATIONS

This section provides specific information on the control measures implemented in Vanderburgh and Warrick Counties, including CAAA requirements and additional state or local measures implemented beyond CAAA requirements.

6.1 Reasonably Available Control Technology (RACT)

As required by Section 172 of the CAAA, Indiana in the mid-1990s promulgated rules requiring RACT for emissions of VOCs. There were no specific rules required by the CAA, such as RACT for existing sources, for these two counties beyond statewide rules. Statewide RACT rules have applied to all new sources locating in Indiana since that time. The Indiana rules are located at 326 IAC 8. The following is a listing of applicable rules:

326 IAC 8-2 Surface Coating Emission Limitations
326 IAC 8-3 Organic Solvent Degreasing Operations
326 IAC 8-4 Petroleum Sources
326 IAC 8-5 Miscellaneous Operation
326 IAC 8-6 Organic Solvent Emission Limitations
326 IAC 8-10 Auto Body Refinishing

6.2 Implementation of Past SIP Revisions

This nonattainment area was not required to develop an Attainment Demonstration SIP for the 1-hour NAAQS. Similarly, since the area was only recently designated non-attainment for ozone and the area has now attained the standard; no Attainment Demonstration SIP has been required to bring the area into attainment for the 8-hour NAAQS. Therefore, this requirement does not apply. Emissions of VOCs are regulated by applicable statewide provisions of 326 IAC 8.

6.3 Nitrogen Oxides (NO_x) Rule

The U.S. EPA NO_x SIP Call required 22 states to adopt rules that would result in significant emission reductions from large EGUs, industrial boilers, and cement kilns in the eastern United States. Indiana passed this rule in 2001. Beginning in 2004, this rule will account for a reduction of approximately 31% of all NO_x emissions state-wide over previous uncontrolled years.

The other states have also adopted these rules. The result is that significant reductions will occur upwind and within the nonattainment area because of the number of large electric utilities located in Kentucky, Indiana, Illinois, and Tennessee. U.S. EPA and IDEM have performed modeling that indicates this area will attain the 8-hour ozone standard with the implementation of the NO_x SIP Call. Controls for EGUs formally commenced May 31, 2004. From Graph 4.3, "NO_x Emissions from Southwest Indiana Electric Generating Units," it can be seen that emissions covered by this program started trending down in 2003 and then much larger reductions were required in 2004. Table 6.1, compiled from data taken from the U.S. EPA Clean Air Markets web site, quantifies the gradual NO_x reductions that have occurred in Indiana as a

result of Title IV of the Clean Air Act Amendments and the beginning of the NO_x SIP Call Rule. This cap will stay in place into the foreseeable future, unless replaced by a newer program such as the Clean Air Interstate Rule.

Further, U.S. EPA has recently published Phase II of the NO_x SIP Call, which establishes a budget for large (greater than 1 ton per day emissions) stationary internal combustion engines. This rule will decrease emissions statewide from natural gas compressor stations by 4263 tons during the ozone season. OAQ is on track to finalize this rule in mid-2005. Implementation of this rule is expected in 2007.

Table 6.1 - Trends in EGU Ozone Season NO_x Emissions State-wide in Indiana

Year	NO_x Emissions, tons / ozone season	NO_x Emission rate, lbs/MMBtu
1997	152,834	0.557
1998	159,931	0.540
1999	149,827	0.502
2000	133,881	0.476
2001	136,121	0.481
2002	114,082	0.409
2003	99,967	0.342
Cap 2004-2009	43,654	0.150

6.4 Measures Beyond Clean Air Act Requirements

Reductions in ozone precursor emissions have occurred, or are anticipated to occur, as a result of federal control programs. These additional control measures include:

Tier 2 Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light trucks, including sport utility vehicles (SUVs). Under this proposal, automakers will be required to sell cleaner cars, and refineries will be required to make cleaner, lower sulfur gasoline. This rule will apply nationwide. The federal rules will phase in between 2004 and 2009. U.S. EPA has estimated that NO_x emission reductions will be approximately 77% for passenger cars, 86% for smaller SUVs, light trucks, and minivans, and 65-95% reductions for larger SUVs, vans, and heavier trucks. VOC emission reductions will be approximately 12% for passenger cars, 18% for smaller SUVs, light trucks, and minivans, and 15% for larger SUVs, vans, and heavier trucks.

Heavy-Duty Diesel Engines

In July 2000, U.S. EPA issued a final rule for Highway Heavy Duty Engines, a program which includes low-sulfur diesel fuel standards, which will be phased in from 2004 through 2007. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule will result in a 40% reduction in NO_x from diesel trucks and buses, a large sector of the mobile sources NO_x inventory.

Clean Air Nonroad Diesel Rule

In May 2004, U.S. EPA issued the Clean Air Nonroad Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard, similar to the highway diesel program. The new standards will cut emissions from nonroad diesel engines by over 90 percent. Nonroad diesel equipment, as described in this rule, currently accounts for 47 percent of diesel particulate matter (PM) and 25 percent of nitrogen oxides (NO_x) from mobile sources nationwide. Sulfur levels will be reduced in nonroad diesel fuel by 99 percent from current levels (from approximately 3,000 parts per million [ppm] now to 15 ppm in 2010). New engine standards take effect, based on engine horsepower, starting in 2008.

Together, these rules will substantially reduce local and regional sources of ozone precursors. The modeling analyses discussed in Section 7 include these rules and show the ozone concentrations expected to result from the implementation of these rules.

6.5 Controls to Remain in Effect

Indiana commits to maintain the control measures listed above after redesignation. Indiana hereby commits that any changes to its rules or emission limits applicable to VOC and/or NO_x sources, as required for maintenance of the ozone standard in Vanderburgh and Warrick Counties, will be submitted to U.S. EPA for approval as a SIP revision.

Indiana, through the Evansville Environmental Protection Agency and IDEM's Office of Air Quality and Office of Enforcement, has the legal authority and necessary resources to actively enforce any violations of its rules or permit provisions. After redesignation, it intends to continue enforcing all rules that relate to the emission of ozone precursors in Vanderburgh and Warrick Counties.

6.6 New Source Review Provisions

Indiana has a longstanding and fully implemented New Source Review (NSR) program. This program is addressed in rule 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration (PSD) permitting program in 326 IAC 2-2. Indiana's PSD program has been approved by U.S. EPA as part of its SIP. (Final program approval – May 20, 2004, 69 FR 290710)

Any facility that is not listed in the 2002 emission inventory, or for the closing of which credit was taken in demonstrating attainment, will not be allowed to construct, reopen, modify, or reconstruct without meeting any applicable permit rule requirement. The review process will be identical to that used for new sources. Once the area is redesignated, OAQ will implement NSR through the PSD program which requires an air quality analysis to ensure that the new source will not threaten to exceed the NAAQS.

6.7 Local Air Quality Mitigation

The Evansville Environmental Protection Agency (Evansville EPA) has worked with the community to identify and implement a number of locally enforceable control measures via ordinance. These ordinances address the following subjects:

County	City	Subject
Chapter 8.12	Section 3.30.214	Burning Regulations.
Chapter 19.08	Section 3.30.248	Gasoline Dispensing Regulations.
Chapter 19.12	Section 3.30.249	Automobile Refinishing.
Chapter 19.16	Section 3.30.250	Pollution Prevention and Education Program.

The City ordinances also address the creation and function of the Evansville EPA, which enforces the local environmental ordinances and performs a variety of state authorized duties via contract with IDEM. Additionally, the Evansville EPA in coordination and cooperation with the Vanderburgh County Health Department, implements a voluntary ozone episodic reduction program as part of its air quality education and outreach program. Although these local air quality mitigation efforts are not deemed permanent and enforceable under state or federal authority, they are a valuable asset to the community and will continue to further supplement air quality improvements in the region.

7.0 MODELING

7.1 Summary of Modeling Results for National Emission Control Strategies in Final Rulemakings

Although U.S. EPA's redesignation guidance does not require modeling for ozone nonattainment areas seeking redesignation, extensive modeling has been performed covering the Southwest Indiana region to determine the effect of national emission control strategies on ozone levels. These modeling analyses determined that Warrick and Vanderburgh Counties are significantly impacted by ozone and ozone precursor transport, and regional NO_x reductions are an effective way to attain the 8-hour standard in this area.

U.S. EPA Modeling Analysis for HDE Final Rulemaking

U.S. EPA conducted modeling for Tier II vehicles and low-sulfur fuels. This analysis was performed in 2000 to support final rulemaking for the Heavy Duty Engine (HDE) and Vehicle Standards and Highway Diesel Fuel and its expected impact on ozone levels. "Technical Support Document for the Heavy Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements: Air Quality Modeling Analyses" (EPA420-R-00-028) was referenced for support of this ozone redesignation for the two counties. Base year emissions from 1996 were modeled for three ozone episodes: June 12-24, 1995; July 5-15, 1995; and August 7-21, 1995. Results of this modeling show that ozone impacts from these fuel emission control measures, as well as the NO_x SIP call, would be substantial in Warrick and Vanderburgh Counties. Relative Reduction Factors (RRF) calculated for each county were 0.8424 for Warrick

County and 0.8800 for Vanderburgh County. These RRFs were applied to the three-year (2001-2003) design values of 85 ppb in Warrick County and 83 ppb in Vanderburgh County. The resulting future year design values were calculated at 71 ppb and 73 ppb, respectively, as shown below in Table 7.1. The modeled future year design values will attain the 8-hour ozone NAAQS.

Table 7.1 - Modeling Results from U.S. EPA HDE Rulemaking for Warrick/Vanderburgh

Monitor ID	Monitor Name	County	Design Value	Modeled Relative Reduction Factor (RRFs)	Future Design Value
			2001-2003	2007 Base	2007
181730002	Yankeetown	Warrick	85	0.8336	70.9
181730008	Boonville	Warrick	81	0.8315	67.4
181730009	Lynnville	Warrick	81	0.8424	68.2
181630012	Evansville	Vanderburgh	83	0.8800	73
181630013	Inglefield	Vanderburgh	77	0.8633	66.5

LADCO Modeling Analysis for 8-Hour Ozone Standard Assessment

The Lake Michigan Air Directors Consortium (LADCO) performed modeling to evaluate the effect of the NO_x SIP Call and Tier II / Low Sulfur rule for future-year 2007 ozone in the Lake Michigan area. This modeling was originally designed to assess the 1-hour ozone standard. Further analysis was conducted and documented in LADCO's White Paper "8-Hour Ozone Assessment," dated May 2, 2001. Base year design values used were the average of the design values for the three 3-year periods (1994-1996, 1995-1997, and 1996-1998). Base year emissions were taken from 1996 and four ozone episodes were evaluated: June 22-28, 1991; July 14-21, 1991; June 13-25, 1995; and July 7-18, 1995. Results are shown in Table 7.2 below.

Table 7.2 LADCO Modeling Results for 8-Hour Ozone Assessment

Monitor ID	Monitor Name	County	Base Year Average Design Value (ppb)	Future Design Value
			'94-'96, '95-'97, '96-'98	2010
181730002	Yankeetown	Warrick	85	75.2
181730008	Boonville	Warrick	81	71.8
181730009	Lynnville	Warrick	81	71.8
181630012	Evansville	Vanderburgh	83	74.5
181630013	Inglefield	Vanderburgh	77	69.1

The resulting future year design values were calculated at 75 ppb for Warrick County and 74 ppb for Vanderburgh County. The modeled future year design values will attain the 8-hour ozone NAAQS of 85 ppb.

7.2 Summary of Modeling Results to Support Proposed Rulemakings

U.S. EPA Modeling for Clean Air Interstate Rule (CAIR), 2004

On March 10, 2005, the U.S. EPA promulgated the Clean Air Interstate Rule (CAIR). NO_x emissions will be cut from 4.5 million tons in 2003 to a cap of 1.5 million tons by 2009 and 1.3 million tons in 2015 in 28 eastern states and the District of Columbia.

U.S. EPA performed modeling to support the associated emission reductions. The modeling was based on 1999 – 2003 design values. Future year modeling was conducted, including for Posey, Vanderburgh, and Warrick Counties, and the future year design values for 2010 and 2015 were evaluated for attainment of the 8-hour ozone NAAQS, as shown below in Table 7.3. Results of the CAIR modeling show that all three will continue to attain the 8-hour ozone NAAQS in 2010. With further reductions projected in CAIR for 2015, all design values continue to decrease.

Table 7.3 Modeling Results from U.S. EPA for the Clean Air Interstate Rule

County	MSA/CMSA	Design Value (ppb)	Future Design Value	Future Design Value
		2000-2002	2010 w/o CAIR	2010 with CAIR
Posey	Evansville	85.7	74.4	73.9
Vanderburgh	Evansville	83.3	72.4	72
Warrick	Evansville	84.5	73.4	73.1

LADCO modeling for Clean Air Interstate Rule (CAIR)

LADCO conducted modeling to determine the impact of the proposed CAIR in the Midwest. The modeling was based on 2001-2003 design values. Future year modeling for 2010 was conducted and the future year design values were determined, as shown below in Table 7.4. Results of the CAIR modeling show Warrick and Vanderburgh Counties will attain the 8-hour ozone NAAQS.

Table 7.4 Modeling Results from LADCO for the Clean Air Interstate Rule

Monitor ID	Monitor Name	County	Design Value (ppb)	Modeled Relative Reduction Factor (RRFs)	Future Design Value
			2001-2003	2010 Base	2010
181730002	Yankeetown	Warrick	85	0.885	75.2
181730008	Boonville	Warrick	81	0.886	71.8
181730009	Lynnville	Warrick	81	0.886	71.8
181630012	Evansville	Vanderburgh	83	0.898	74.5
181630013	Inglefield	Vanderburgh	77	0.898	69.1

7.3 Summary of Existing Modeling Results

U.S. EPA and LADCO modeling for future year design values have consistently shown that existing national emission control measures will bring Warrick and Vanderburgh Counties into attainment of the 8-hour ozone NAAQS. Proposed rulemakings to be implemented in the next several years will provide even greater assurance that air quality will continue to meet the standard into the future. Modeling support for the NO_x SIP Call, Heavy Duty Engine and Highway Diesel Fuel and Tier II/Low Sulfur Fuel has shown that future year design values for Warrick and Vanderburgh Counties will attain the ozone standard with modeled future year design values well below 85 ppb. U.S. EPA has modeled base case future years with existing emission controls only and shown that Warrick and Vanderburgh Counties will attain the 8-hour ozone NAAQS without proposed additional national emission control strategies. Future national emission control strategies will ensure that each county's attainment will be maintained with an increasing margin of safety over time.

7.4 Temperature Analysis for Warrick and Vanderburgh County

Meteorological conditions are one of the most important factors that influence ozone development and transport. A temperature analysis has been conducted to determine how the temperatures during the ozone conducive months of May, June, July, August and September compare to normal temperatures for the Southwest Indiana area for the years 1971 through 2000. Complete climatological data is not available for Warrick and Vanderburgh counties. Therefore, the Evansville National Weather Service Office Climate Data data as well as other weather stations in southwest Indiana including Bloomfield, Boonville, Dubois, Freelandville, Huntingburg, Mount Vernon, Shoals, St. Meinrad and Washington were used to fill in any missing data. The data from the additional weather stations was used to calculate the average number of 90 degree days from 1995-1999. Available normal maximum temperatures by summer months from 1971-2004 for the Evansville, Southwest Indiana area are as follows:

May – 77.0^{o} F
June – 85.6^{o} F
July – 89.1^{o} F
August – 87.6^{o} F
September – 81.3^{o} F
May - September – 84.1^{o} F

Evansville's monthly maximum temperatures for the previous 9 years (1996 – 2004) during the summer months are compared to normal summer month temperatures in Table 7.5. Overall, the temperatures during the 2002 summer months of May, June, July, August, and September were 1% to 2% higher while temperatures during the 1996, 1997, 2000, 2001, 2003 and 2004 summer months were 1% to 5% lower than the normal temperatures. Table 7.5 shows the average temperatures in Southwest Indiana for each of the past nine years and the percent difference from normal for each year.

Table 7.5 Analysis of Maximum Temperatures for Southwest Indiana

(Percent Change from Maximum Temperature (^{o}F) Normals (1971 – 2004))

	Normal	1996		1997		1998		1999	
	Max	Max	%	Max	%	Max	%	Max	%
May	77.0	76.9	0	70.3	-9	77.5	+1	76.3	-1
June	85.6	83.5	-2	78.5	-8	82.3	-4	82.7	-3
July	89.1	84.7	-5	87.4	-2	84.4	-5	88.5	-1
August	87.6	86	-2	82.4	-6	85.2	-3	83	-5
September	81.3	77.4	-5	79.7	-2	84.1	+3	83.3	+2
AVERAGE	84.1	81.7	-3	79.7	-5	82.7	-2	82.8	-2

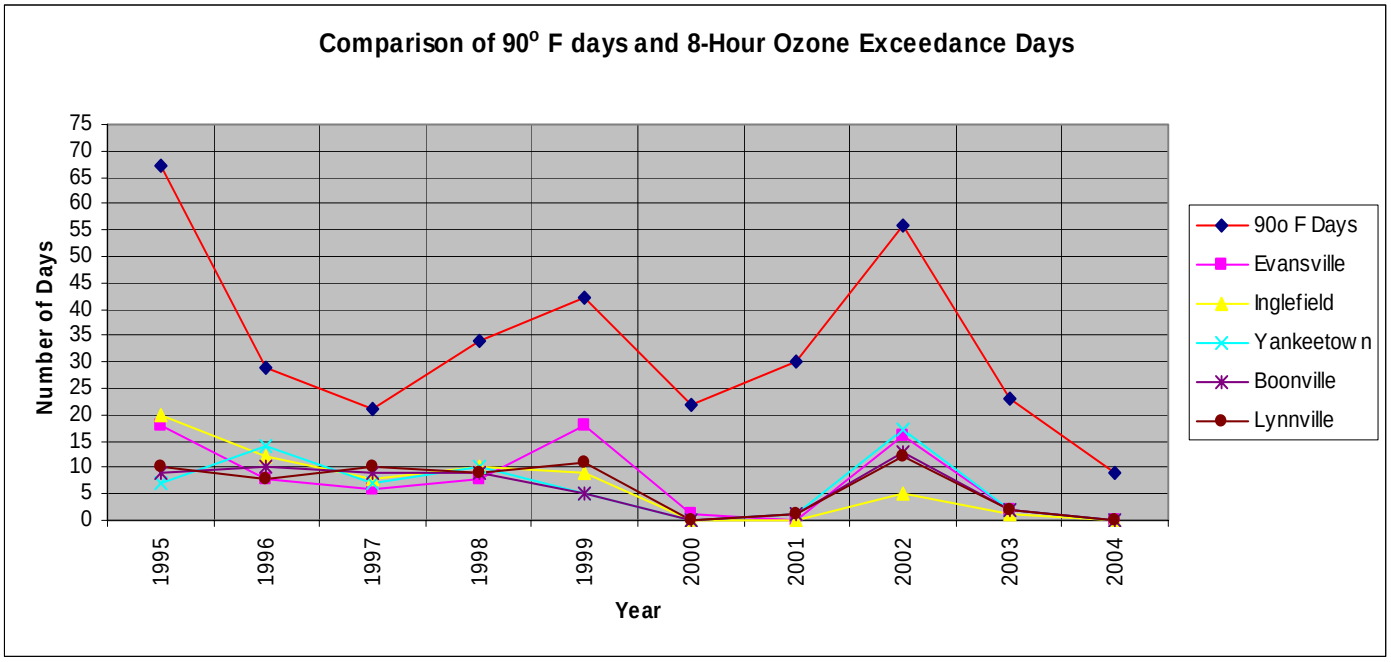
	2000		2001		2002		2003		2004	
	Max	%	Max	%	Max	%	Max	%	Max	%
May	77.8	+1	79.2	+3	74.4	-3	73.6	-4	79.8	+4
June	83.9	-2	82.5	-2	86.6	+1	80.0	-7	83.7	-2
July	84.7	-5	87.5	-2	90.5	+2	87.1	-2	84.3	-5
August	86.0	-2	86.2	-2	89.8	+3	87.6	0	82.9	-5
September	78.2	-4	79.0	-3	85.7	+5	80.4	-1	82.3	-1
AVERAGE	82.1	-2	83.0	-1	85.4	+2	81.7	-3	82.6	-2

The number of days with temperatures of 90^{o} F and higher was taken from National Weather Service data from the Evansville Regional Airport compared to the normal number of days from 1995 through 2004. Table 7.6 shows a comparison of 8-hour ozone exceedances and temperatures while Graph 7.1 shows the correlation graphically.

Table 7.6 - Comparison of Days with 90^{o} F and 8-Hour Ozone Exceedance Days

Number of Days with Temperatures of 90^{o} F and higher											
	Normal	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
# of 90^{o} F days	**41.9**	**67**	**29**	**21**	**34**	**42**	**22**	**30**	**56**	**23**	**9**
Number of 8-Hour Exceedance Days at Vanderburgh and Warrick County ozone monitors											
Monitor	County	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Evansville	Vander.	**18**	**8**	**6**	**8**	**18**	**1**	**0**	**16**	**2**	**0**
Inglefield	Vander.	**20**	**12**	**8**	**10**	**9**	**0**	**0**	**5**	**1**	**0**
Yankeetown	Warrick	**7**	**14**	**7**	**10**	**5**	**0**	**1**	**17**	**2**	**0**
Boonville	Warrick	**9**	**10**	**9**	**9**	**5**	**0**	**1**	**13**	**2**	**0**
Lynnville	Warrick	**10**	**8**	**10**	**9**	**11**	**0**	**1**	**12**	**2**	**0**

Graph 7.1 - Comparison of Days with 90^{o} F and 8-Hour Ozone Exceedance Days



As can be seen, a greater number of ozone exceedance days per year correlate with a greater number of 90° F days per year.

7.5 Summary of Meteorological Conditions

The analysis of the departure from normal of the maximum temperatures during the summer months shows variation as illustrated in Table 7.6. The analysis shows that 20 or more days with temperatures of 90° F and higher occurred in all years but 2004. The number of 8-hour ozone exceedance days for those years shows a greater correlation to the number of higher temperature days. However, the years with a lesser number of 90° F days still yielded 8-hour ozone exceedance days. For example, 1997 temperatures were on average 5% cooler than normal. However, there were still a significant number of 8-hour ozone exceedances for that year. In comparison, 2003 was also a cooler year, but due to lower emissions than in 1997, there were fewer ozone exceedances. Lower ozone values correspond to lowered local and regional ozone precursor emissions. This is why U.S. EPA developed the 8-hour standard as a 4th high ozone value averaged over 3 years to account for variations in temperature. Despite such variations, ozone values in Vanderburgh and Warrick counties have steadily decreased since 1995.

8.0 CORRECTIVE ACTIONS

8.1 Commitment to Revise Plan

As noted in Section 4.5 above, Indiana hereby commits to revise its Maintenance Plan eight years after redesignation, as required by Section 175(A) of the CAAA.

8.2 Commitment for Contingency Measures

Indiana hereby commits to adopt and implement expeditiously necessary corrective actions in the following circumstances:

Warning Level Response

A Warning Level Response shall be prompted whenever an annual (1-year) fourth high monitored value of 88 ppb occurs in a single ozone season within the maintenance area. A Warning Level Response will consist of a study to determine whether the ozone value indicates a trend toward higher ozone values or whether emissions appear to be increasing. The study will evaluate whether the trend, if any, is likely to continue and, if so, the control measures necessary to reverse the trend taking into consideration ease and timing for implementation, as well as economic and social considerations. The study, including the applicable recommended next steps, shall be completed within 12 months from the close of the most recent ozone season (September 30).

Should it be determined through the Warning Level study that action is necessary to reverse the noted trend, the procedures for control selection and implementation outlined under "Action Level Response" shall be followed.

Action Level Response

An Action Level Response shall be prompted whenever a two-year average fourth high monitored value of 85 ppb occurs within the maintenance area. In the event that the Action Level is triggered and is not due to an exceptional event, malfunction, or noncompliance with a permit condition or rule requirement, IDEM will determine additional control measures needed to assure future attainment of NAAQS for ozone. In this case, measures that can be implemented in a short time will be selected in order to be in place within 18 months from the close of the ozone season that prompted the Action Level.

Control Measure Selection and Implementation

Adoption of any additional control measures is subject to the necessary administrative and legal process. This process will include publication of notices, an opportunity for public hearing, and other measures required by Indiana law for rulemaking by state environmental boards.

If a new measure/control is already promulgated and scheduled to be implemented at the federal or state level, and that measure/control is determined to be sufficient to address the upward trend

in air quality, additional local measures may be unnecessary. IDEM will submit to EPA an analysis to demonstrate the proposed measures are adequate to return the area to attainment.

8.3 Contingency Measures

Contingency measures to be considered will be selected from a comprehensive list of measures deemed appropriate and effective at the time the selection is made. Listed below are example measures that may be considered. The selection of measures will be based upon cost-effectiveness, emission reduction potential, economic and social considerations or other factors that IDEM deems appropriate. IDEM will solicit input from all interested and affected persons in the maintenance area prior to selecting appropriate contingency measures. All of the listed contingency measures are potentially effective or proven methods of obtaining significant reductions of ozone precursor emissions. Because it is not possible at this time to determine what control measure will be appropriate at an unspecified time in the future, the list of contingency measures outlined below is not comprehensive.

1) Lower-reid vapor pressure gasoline program.

2) Broader geographic applicability of existing measures.

3) Tighten RACT on existing sources covered by US EPA Control Technique Guidelines issued in response to the 1990 CAAA.

4) Apply RACT to smaller existing sources.

5) A modern vehicle inspection/maintenance program.

6) One or more transportation control measures sufficient to achieve at least 0.5% reduction in actual area wide VOC emissions. Transportation measures will be selected from the following, based upon the factors listed above after consultation with affected local governments:

    a) Trip reduction programs, including, but not limited to, employer-based transportation management plans, area wide rideshare programs, work schedule changes, and telecommuting.

    b) Transit improvements.

    c) Traffic flow improvements.

    d) Other new or innovative transportation measures not yet in widespread use that affects state and local governments deemed appropriate.

7) Alternative fuel and diesel retrofit programs for fleet vehicle operations.

8) Controls on consumer products consistent with those adopted elsewhere in the United States.

9) Require VOC or NO_x emission offsets for new and modified major sources.

10) Require VOC or NO_x emission offsets for new and modified minor sources.

11) Increase the ratio of emission offsets required for new sources.

12) Require VOC or NO_x controls on new minor sources (less than 100 tons).

No contingency measure shall be implemented without providing the opportunity for full public participation during which the relative costs and benefits of individual measures, at the time they are under consideration, can be fully evaluated.

9.0 PUBLIC PARTICIPATION

Indiana published notification for a public hearing and solicitation for public comment concerning the draft Redesignation Petition and Maintenance Plan in several publications, including the primary Evansville newspaper on or before March 18, 2005. A public hearing was conducted on April 19, 2005 and a number of comments were received. The public comment period closed on April 22, 2005. Appendix E includes a copy of the public notice, certifications of publication, the transcript from the public hearing, copies of all written comments received, and a summary of all comments received that includes IDEM's responses, as applicable.

10.0 CONCLUSIONS

The Vanderburgh and Warrick Counties basic nonattainment area has attained the NAAQS standard and complied with the applicable provisions of the 1990 Amendments to the Clean Air Act regarding redesignation of basic ozone nonattainment areas. Documentation to that effect is contained herein. IDEM has prepared a State Implementation and Maintenance Plan that meets the requirements of Section 110(a)(1) of the 1990 Clean Air Act.

Indiana has performed an analysis that shows the air quality improvements are due to permanent and enforceable measures. In addition, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standard and that all CAAA requirements necessary for redesignation have been met.

Based on this presentation, the Vanderburgh and Warrick counties ozone basic nonattainment area meets the requirements for redesignation under the CAA and U.S. EPA guidance. Furthermore, because this area is subject to significant transport of pollutants, significant regional NO_x reductions will ensure continued compliance (maintenance) with the standards with an increasing margin of safety.

The State of Indiana hereby requests that the Vanderburgh and Warrick Counties ozone basic nonattainment area be redesignated to attainment simultaneously with U.S. EPA approval of the Indiana State Implementation and Maintenance Plan provisions contained herein.